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Mr. Danny McClure
Regional Water Quality Control Board
Central Valley Region
11020 Sun Center Drive, #200
Rancho Cordova, CA 95670

SUBJECT: Comments on Clean Water Act Sections 305(b) and 303(d) Integrated Report for the Central Valley Region

Dear Mr. McClure:

I am submitting these comments on behalf of my client, The Pyrethroid Working Group (PWG). The PWG has reviewed the Public Review Draft of the *Clean Water Act Sections 305(b) and 303(d) Integrated Report for the Central Valley Region* (January 2009) (Draft 303(d) List). The PWG is a consortium of pyrethroid registrants working collectively to address questions regarding the use of pyrethroid pesticides. The Draft 303(d) List includes a number of new listings for pyrethroid pesticides that are of concern to the PWG. In general, the PWG is concerned that the listing process as applied by the Central Valley Regional Water Quality Control Board (Regional Water Board) relies primarily on a single line of evidence approach to determine impairment, and to identify pollutants as the cause of impairment. This reliance on a single line of evidence leads to incorrect conclusions with respect to impairments caused by pyrethroid pesticides. Our general comments, and more specific comments on certain listings, are provided below.

I. General Concerns with the 303(d) Listing Process

The state's *Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List* (303(d) Listing Policy) allows the Regional Water Board, and others, to use toxicity data from single species toxicity tests and/or exceedances of chemical criteria, targets or objectives to determine if a water body is impaired. These approaches involve uncertainty and are in fact a *predictive* method of assessing the

condition of resident biological communities, which is merely a prediction of what is happening in the aquatic environment. In contrast, bioassessments are an *observed* method, which directly measures the condition of resident biological assemblages that exist in the aquatic environment.

More specifically, uncertainty can exist when using only single species toxicity test results to predict ecological effects in the ambient environment because of: variability in individual response to chemical exposure; variation among species in sensitivity to chemicals; effects of time varying or repeated exposures; and, extrapolation from individual to population-level endpoints. Likewise, uncertainty can also exist when using exceedances of chemical concentrations in water or sediment for impairment listings. These areas of uncertainty include but are not limited to: spatial and temporal variability of chemical measurements for assessing the biological condition of the water body; measurement of the bioavailable components of chemicals; sensitivity of chemical measurement methods to measure concentrations that are low enough to be biologically meaningful; and, number of chemical exceedances from environmental grab samples that are actually needed to impair resident biological communities. Further, reliance on chemical criteria exceedances also assumes that chemicals alone are responsible for impairment and ignores other stressors that may be present and contributing to impairment of the aquatic system such as impaired physical habitat, invasive species and water diversion.

Bioassessments, on the other hand, are a more direct and reliable method for measuring impairment in water bodies because they directly measure the condition of resident biological assemblages that exist in these aquatic environments. This is an essential element because the biological condition of an aquatic community determines how well a water body supports aquatic life. More specifically, resident biota serve as environmental barometers as they integrate all biological, chemical and physical stressors. With time, biological communities respond to stresses of all degrees and therefore offer information on impairment not always obtained from episodic water chemical measurements or discrete single species toxicity tests. This robust approach for describing the ecological status of water bodies based on the condition of resident taxa (i.e., bioassessment) provides an *observed* response to water body conditions. The underpinnings of bioassessments are that the structure and function of an aquatic biological community can provide critical information about the quality of the surface water and sediment.

Bioassessments, formally defined as a quantitative survey of biological communities and physical habitat within a water body, are a well-established approach used throughout the United States for determining the ecological condition of stream and river systems. (Yoder and Rankin, 1995; Karr and Chu, 1999; Barbour *et al*., 1996;

Wright *et al*., 2000; Bailey *et al*., 2004, among others.) Most states that use bioassessments focus on benthic macroinvertebrates for assessing the condition of water bodies. (Barbour, 2002.) The states that have been the most progressive in developing bioassessment programs and biocriteria (descriptive or numerical biological conditions with a designated aquatic life use) are Maine, Vermont, Maryland, Ohio, Florida, Arizona and Oregon. (Barbour, 2002.) In fact, states such as Maine, Ohio, Vermont and Florida (among others) use bioassessment data to evaluate water bodies to determine if appropriate to list as impaired. (Jeroen Gerritsen, Tetra Tech Inc., personal communication.)

Like other states, state agencies in California also recognize the value in using bioassessments to evaluate the health of the aquatic environment. For example, assessments of benthic invertebrate assemblages and physical habitat (bioassessments) have been conducted in wadeable streams in the Central Valley for a number of years. (See Bacey, 2005; Bacey and Spurlock, 2007; Brown and May, 2004; Hall and Killen, 2001; Hall and Killen, 2002; Hall and Killen, 2003; Hall and Killen, 2004; Hall and Killen, 2005a; Hall and Killen, 2005b; Hall *et al.* in press; Jim Harrington, California Department of Fish and Game, personal communication; Tetra Tech, 2003.) Furthermore, the California Department of Fish and Game (CDFG) formed a reference site expert panel in 2007 to develop a network of reference sites in California to interpret bioassessment data in the context of impairment. (Peter Ode, CDFG, personal communication.) Currently, two Regional Water Quality Control Boards in California (Regional Water Boards 6 and 9) use bioassessment data to make regulatory decisions and other regions have developed or are in the process of developing bioassessment programs. (Peter Ode, CDFG, personal communication.)

Bioassessments are also valuable for determining the status of aquatic biological communities across large spatial scales and land use types (agricultural and urban), and information on the status of resident biological communities is particularly useful when developing total maximum daily loads (TMDLs) and/or when measuring success of voluntary or regulatory actions. Bioassessments are useful in this manner because they serve monitoring needs through three primary functions: (1) screening or initial assessment of conditions; (2) characterization of impairment and diagnosis; and (3) trend monitoring to evaluate improvements from mitigation practices or further degradation. Accordingly, bioassessments are recommended and/or supported by the National Research Council (NRC), U.S. EPA and California Environmental Protection Agency (CalEPA). More specifically, in 2001 the NRC prepared a report with respect to various issues associated with TMDLs and impaired water bodies. In its report, the NRC recommended the use of biological criteria in conjunction with physical and chemical criteria to determine whether a water body is meeting its requirements for designated use. Further, the report supports the use of biological data for determining

the status (or potential impairment) of water bodies by stating that biological criteria are more closely related to designated uses of a water body than are chemical or physical measurements. A recent EPA report entitled "*Consolidated Assessment and Listing Methodology*" (CALM document) supports the use of bioassessments for determining attainment of aquatic life-based water quality standards by stating that bioassessment data are core indicators (critical or essential indicators) (U.S. EPA, 2002.) CalEPA and the State Water Resources Control Board (State Water Board) endorse the use of bioassessment data as a key component in a multiple lines of evidence approach for the development of sediment quality objectives in bays and estuaries of the State. (CalEPA, 2007.)

In conclusion, bioassessments provide a direct means of measuring compliance with the goal of biotic integrity stipulated under the Clean Water Act because assemblages of aquatic organisms (e.g., macroinvertebrates) are comprised of taxa that are differentially responsive to different environmental stressors, and the diversity and condition of these taxa reflect overall ecological integrity (i.e., chemical, physical and biological integrity) within a water body. Based on the rationale provided above, we strongly recommend that the Regional Water Board rely on bioassessment data, if available, for determining impairment and the causes of impairment.

II. The Regional Water Board has the Discretion to Use Bioassessment Data

The 303(d) Listing Policy provides the Regional Water Board with significant discretion to use bioassessment data in listing and delisting decisions. For example, section 6.1.5 of the 303(d) Listing Policy states, "[b]efore determining if water quality standards are exceeded RWQCBs have *wide discretion* establishing how data and information are to be evaluated, ..." (303(d) Listing Policy at p. 22, emphasis added.) This section of the 303(d) Listing Policy further provides that the Regional Water Board must consider environmental conditions of a water body or a site when evaluating data for use in listing decisions. (See 303(d) Listing Policy, § 6.1.5.1, at p. 23.) Finally, the 303(d) Listing Policy specifically provides for the *Evaluation of Bioassessment Data*. (See 303(d) Listing Policy, § 6.1.5.8, at p. 25.)

In light of the Regional Water Board's discretion with respect to using bioassessment data, the PWG recommends that the Regional Water Board re-evaluate its proposed listing for Pleasant Grove Creek and its tributaries (South Branch and Kaseberg Creek) as impaired based on the presence of pyrethroids. This proposed listing is based on single species sediment toxicity tests with the pyrethroid-sensitive amphipod (*Hyalella azteca*) and concurrent sediment measurements of pyrethroids. However, as discussed further below, a two-year bioassessment study in Pleasant Grove Creek and its tributaries demonstrate that pyrethroids are not a significant

stressor. (See Attachment 1: An Assessment of Benthic Communities with Concurrent Physical Habitat, Pyrethroid, and Metals Analysis in an Urban and Residential Stream in California in 2006 and 2007 (Pyrethroid Bioassessment Study); see also Attachment 2 *The Influence of Physical Habitat, Pyrethroids and Metals on Benthic Community Condition in an Urban and Residential Stream in California* (currently in press in the Journal Human and Ecological Risk Assessment), which summarizes information from the Pyrethroid Bioassessment Study.) Further, we encourage the Regional Water Board to use bioassessment data to reassess other pyrethroid listings under section 4.11 of the 303(d) Listing Policy, which allows the Regional Water Board discretion to determine if de-listing is appropriate based on situation-specific weight of evidence. (See 303(d) Listing Policy, § 4.11, at p. 13.)

III. Remove Proposed Listing of Pleasant Grove Creek based on Pyrethroids

Pleasant Grove Creek and its tributaries (South Branch and Kaseberg Creek) is a residential creek located in Roseville, California that is characterized by numerous contiguous subdivisions of single-family homes that are less than ten years old. There is no industry in the area and sparse commercial development and agriculture. The Regional Water Board proposes to list Pleasant Grove Creek and it tributaries (South Branch and Kaseberg Creek) as an impaired water body based on the presence of pyrethroids. This impairment listing is based on results from single species sediment toxicity tests with the amphipod, *Hyalella azteca*, with concurrent sediment measurements of pyrethroids conducted by Don Weston and his colleagues from University of California at Berkeley (Amweg *et al.*, 2005). These single species toxicity test results with *Hyalella azteca,* which is documented as an extremely pyrethroid-sensitive test species (Giddings 2006), in concert with concurrent sediment measurements of pyrethroids contain uncertainty as described above. By contrast, recent bioassessment data collected from a multiple-year/multiple-stressor study (including pyrethroids) in Pleasant Grove Creek provides data to demonstrate that the proposed listing for pyrethroids in Pleasant Grove Creek and its tributaries (South Branch and Kaseberg Creek) is unjustified.

In 2006 and 2007, a bioassessment study designed to characterize benthic communities and physical habitat was conducted at 21 sites in Pleasant Grove Creek, South Branch and Kaseberg Creek using the same sites that were sampled (2004) by Amweg *et al.*, 2005. (See Attachment 1, Pyrethroid Bioassessment Study.) In the Pyrethroid Bioassessment Study, concurrent water quality evaluations, physical sediment parameters, eight specific pyrethroids, and bulk metals (including simultaneously extracted metals (SEM) and acid volatile sulfides (AVS) ratios) were measured during both years of the study. The relationships of various benthic metrics (e.g., characteristics such as taxa richness, % dominant taxa, etc.) to habitat metrics,

pyrethroids and metals were also evaluated for both years of sampling in order to tease out the most significant stressors potentially impacting resident benthic communities.

The results from this multiple-year study showed that there were ten different significant relationships with various benthic metrics and the various stressors. Nine significant relationships were reported between benthic metrics and various habitat metrics and most of these relationships were reported for velocity depth regimes (slow-deep, slow-shallow, fast-deep, and fast-shallow aquatic environments). One significant positive relationship was reported for % tolerant taxa and mercury (tolerant taxa increase as mercury concentrations increased). However, there were no significant relationships between any of the benthic metrics and the eight pyrethroids that were measured in Pleasant Grove Creek, South Branch and Kaseberg Creek.

Thus, this integrated bioassessment tool/dataset that evaluated the influence of physical habitat, metals and pyrethroids on resident benthic communities in two concurrent years demonstrated that pyrethroids were not a significant stressor in Pleasant Grove Creek and its tributaries. Based on this information, the Regional Water Board should use its discretion under section 6.1.5 of the 303(d) Listing Policy to find that pyrethroid pesticides are not a cause of impairment for Pleasant Grove Creek and its tributaries. Therefore, Pleasant Grove Creek, South Branch and Kaseberg Creek should not be listed as impaired water bodies based on the presence of pyrethroids.

V. Revise Expected TMDL Completion Date for Del Puerto Creek

The Draft 303(d) List includes a number of new listings for pyrethroids. With one exception, the expected TMDL completion date for all pyrethroid listings is 2021. For Del Puerto Creek, however, the Draft 303(d) List includes a TMDL completion date of 2010 for the Bifenthrin and pyrethroid listings. It is our understanding that the Regional Water Board has *not* begun to prepare a pyrethroid TMDL for Del Puerto Creek. Considering the lack of effort to date and the need for more information with respect to pyrethroids, we recommend that the TMDL completion date for Del Puerto Creek be changed from 2010 to 2021 to be consistent with the other listings.

In conclusion, the PWG encourages the Regional Water Board to use bioassessment data in its regulatory processes, including decisions with respect to listing and delisting on the 303(d) list. As indicated above, bioassessments provide the Regional Water Board with an *observed* response as the information is direct and reliable. In contrast, single species toxicity tests and/or exceedances of chemical criteria are *predictive* methods with inherent uncertainty. Thus, bioassessment must be given a higher priority when making regulatory decisions. If you have any questions

with respect to the information included here, please contact me directly at (916) 443-2793.

Sincerely,

James Wells